

SB761
W7R62
#13

THE STATUS OF WHITE PINE BLISTER RUST
ON LIMBER PINE AND WHITEBARK PINE
IN WYOMING



FOREST INSECT AND DISEASE MANAGEMENT
STATE AND PRIVATE FORESTRY
ROCKY MOUNTAIN REGION
USDA FOREST SERVICE
11177 W. 8TH AVENUE
LAKEWOOD, CO 80225

THE STATUS OF WHITE PINE BLISTER RUST
ON LIMBER PINE AND WHITEBARK PINE
IN WYOMING

by

Donald H. Brown

Former Plant Pathologist, Forest Insect and Disease Management,
State and Private Forestry, Rocky Mountain Region, USDA, Forest
Service, Lakewood, Colorado; now a Baptist Pastor.

Technical Report R2-13

July 1978

Forest Insect and Disease Management
State and Private Forestry
Rocky Mountain Region
USDA Forest Service
11177 W. 8th Avenue
Lakewood, CO 80225

ACKNOWLEDGMENT

Final preparation of this report was made by Dr. David W. Johnson, Forest Insect and Disease Management, State and Private Forestry, Lakewood, Colorado in the absence of the author. Review by Dr. Frank G. Hawksworth, Rocky Mountain Forest and Range Experiment Station, is appreciated.

INTRODUCTION

Since the discovery of white pine blister rust, *Cronartium ribicola* J. C. Fischer ex Rabh., in Vancouver, British Columbia in 1910 the disease has spread throughout much of the range of white pines in the western United States. Some stands of limber pine, *Pinus flexilis*, have become heavily infected or even destroyed by the blister rust fungus (4). The largest areas of uninfested limber pine are found in the central and southern Rocky Mountains. New locations of the rust were found recently in southeastern Montana (2). The southern most known occurrence of the disease in the central Rocky Mountains is south of Sybille Creek Canyon in the Laramie Mountains of Wyoming.

In Wyoming the disease, first discovered on *Ribes* spp. in Yellowstone National Park in 1945, has been detected on pine and *Ribes* spp. in several areas of the State (1, 3). This report describes the known distribution of the disease on pine throughout the state outside Yellowstone National Park.

METHODS AND MATERIALS

Surveys for white pine blister rust on limber pine, whitebark pine (*P. albicaulis*) and the alternate host, *Ribes* spp. in Wyoming were conducted by U. S. Forest Service inter-regional survey teams in 1968, 1969, 1973, 1974, and 1976 in the Bighorn Mountains in north-central Wyoming and in the Laramie Mountains and other mountain ranges in central and southeastern Wyoming. Whitebark pine does not occur in this part of the State. Surveys were conducted by Region 4 (Intermountain Region) personnel in selected areas west of the Continental Divide since 1967.

Much of the limber pine in Wyoming occurs as small stands or groups of scattered individuals, sometimes growing under very adverse site conditions. Limber pine is an intolerant species frequently growing on dry, southern exposures and ridgetops (Fig. 1a). During surveys limber pine were located and examined, in areas where the disease was known or suspected to occur, by traversing roads using U. S. Geological Survey maps and by working outward from known infection centers. Trees of various ages were examined in June and July when the aecial spore stage on the pine host was prominent. This facilitated the detection of new infections. Recently surveys for the rust on *Ribes* spp. were discontinued because of time limitations and greater interest in detecting the disease on pine.

RESULTS AND DISCUSSION

White pine blister rust was found on limber pine in 6 of 15 counties in Wyoming: Albany, Johnson, Lincoln, Park, Sheridan and Teton, and in Yellowstone National Park where both species of white pine are present. The newest discoveries were in the central and southern part of the State.

Many areas have not been visited since the year the disease was first discovered. All the known locations of the rust on pine, outside of Yellowstone National Park, are listed in Tables 1 and 2. The total listing is divided for convenience using the Continental Divide, which coincides with the Regional boundaries. The status of the disease on the Bighorn and Medicine Bow National Forests follows.

Bighorn National Forest

With the exception of Shell Creek Canyon all the discoveries on the Bighorn National Forest were made on the eastside of the Bighorn Mountains. The disease appears to have initiated in the Tongue River Drainage where it has become epidemic particularly along Turkey Creek, one of the tributaries. The disease was less common to the west particularly along Boyd Ridge where only one canker was seen. The infection center in Teepee Creek had cankers as old as those seen in Turkey Creek.

White pine blister rust was also detected near the southern boundary of the Bighorn National Forest west of Mayoworth, Johnson County, in 1969 and again in 1973. The rust was scattered and of light intensity making it very difficult to find. These rust cankers ranged in age from 6 to 20 years. In contrast to the situation in some of the infection centers located in the northern part of the Bighorn National Forest, the disease near the southern boundary of the Forest appeared to be in the early stages of establishment. The distribution of the disease on pine in northcentral Wyoming appears to be restricted to the eastern slopes and drainages of the Bighorn Mountains.

Medicine Bow National Forest

More is known about the distribution of the rust in the Laramie Peak Ranger District, Medicine Bow National Forest than for any

other district included in this report. In almost every case the disease was found on open grown, scattered trees where ribes were scarce (Fig. 1b, 1c). In spite of the scarcity of the alternate host, the disease is intensifying quite rapidly in the Potato Creek and George Creek drainages causing branch dieback and tree mortality.

The disease was reported on ribes in 1952 in Middle Crow Creek drainage, Pole Mountain (1), but was not observed on ribes or pine during subsequent examinations.

Discoveries made in 1969 west of Wheatland, Albany County, in the Laramie Mountains in and adjacent to the Medicine Bow National Forest, extended the known limits of white pine blister rust into southeastern Wyoming approximately 190 miles from the nearest known infection centers on limber pine in the Bighorn Mountains and within 60 miles of the Wyoming - Colorado state line. The disease is locally well established, with some trees having 50 or more branch cankers as well as main stem cankers which range in age from 5 to 20 years. Some of these trees, although heavily infected were not dying from the disease. The area of limber pine infested with white pine blister rust covers approximately 10 townships. In sample area No. 18 (Table 1) several trees were infected with rust and dwarf mistletoe, *Arceuthobium cyanocarpum* Coulter and Nelson. This situation is probably uncommon since this is the only area in Wyoming where both diseases are known to occur.

LITERATURE CITED

1. BROWN, D. H. 1967. White pine blister rust survey in Montana and Wyoming 1966. USDA, Forest Service, State and Private Forestry, Northern Region, Mimeo. Sep. August 1967, 11 pp.
2. BROWN, D. H. 1970. Recent discoveries extend distribution range of two destructive diseases of limber pine in southeastern Montana. Plant Dis. Rep. 54:441.
3. BROWN, D. H. and D. A. GRAHAM. 1969. White pine blister rust survey in Wyoming, Idaho and Utah, 1967. USDA, Forest Service, State and Private Forestry, Northern Region, Mimeo. Rep. 9 pp.
4. GAUTREAU, E. 1963. Effects of white pine blister rust in limber pine stands of Alberta, Canada. Dep. of For. Ent. and Path. Branch, Bi-monthly Progress Rep. 19 (4):3.

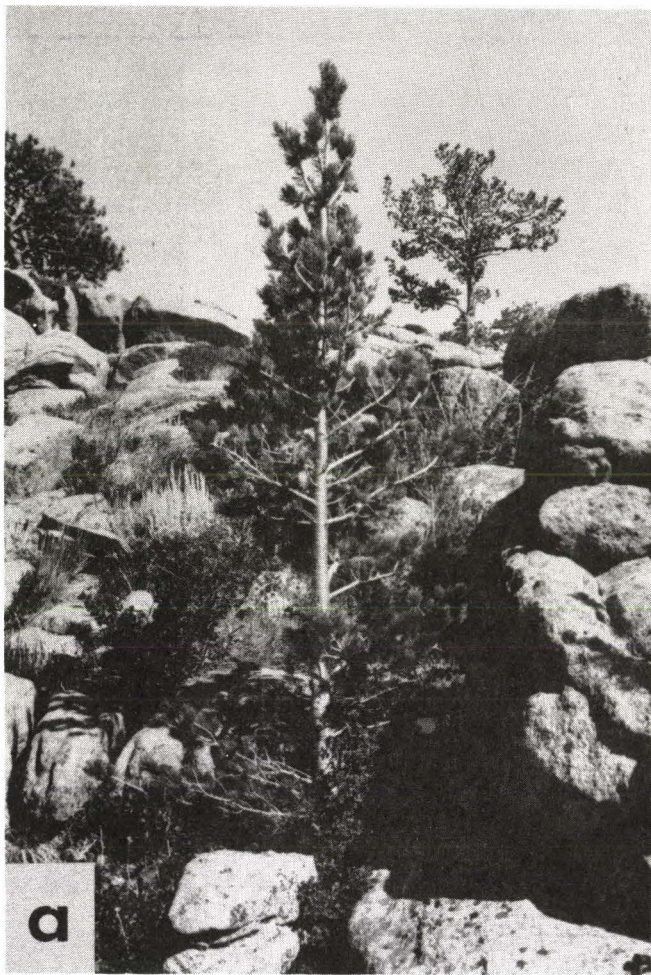


FIGURE 1

White Pine Blister Rust on Limber Pine

- (a) Typical limber pine habitat in the Laramie Mountains, Wyoming
- (b) Top-kill of limber pine caused by *Cronartium ribicola*
- (c) Ribes plants growing in close proximity to limber pine

TABLE 1 KNOWN LOCATIONS OF WHITE PINE BLISTER RUST ON LIMBER PINE EAST OF THE CONTINENTAL DIVIDE IN WYOMING

SAMPLE AREA	LAND UNIT		DRAINAGE	LOCATION			WHITE PINE NUMBER EXAMINED	WHITE PINE NUMBER INFECTED	YEAR DISCOVERED	AGE OF OLDEST INFECTION
	FOREST	DISTRICT		T	R	S				
1	Bighorn	Tongue	Tepee Creek	54 N	85 W	28	350	175	1966	30 years +
2	Bighorn	Tongue	Hurlburt Creek	54 N	85 W	27	20	9	1966	30 years +
3	Bighorn	Tongue	Turkey Creek	56 N	87 W	9 & 10	5	4	1966	30 years +
4	Bighorn	Tongue	Turkey Creek	56 N	87 W	17 & 20	223	200	1966	30 years +
5	Bighorn	Tongue	Turkey Creek	56 N	87 W	29 & 30	85	61	1966	30 years +
6	Bighorn	Tongue	Tongue River	56 N	88 W	6	450	8	1966	30 years +
7	Bighorn	Medicine Wheel	Mann Creek	57 N	90 W	19 & 20	300	1	1966	15 years
1/ 8	Bighorn	Medicine Wheel	Shell Creek	53 N	89 W	15	-	1	1959	--
9	BLM	--	Poison Creek	48 N	83 W	29	50	3	1973	14 years
10	BLM or private	--	North Fork	45 N	84 W	26	25	2	1973	15 years +
11	BLM or private	--	North Fork	45 N	84 W	35	20	3	1969	--
12	BLM or private	--	North Fork	44 N	84 W	1	16	2	1969	--
13	Medicine Bow	Laramie Peak	Bear Creek	26 N	73 W	2	6	3	1976	15 years +
14	Medicine Bow	Laramie Peak	Sheldon Creek	26 N	73 W	3	4	2	1976	--
15	Medicine Bow	Laramie Peak	Nine Draw	26 N	73 W	4	5	3	1976	--
16	Medicine Bow	Laramie Peak	Nine Draw	26 N	73 W	9	25	6	1973 & 1976	mostly 10 years old
17	Medicine Bow	Laramie Peak	Hay Draw	26 N	73 W	8	-	-	1976	--
2/ 18	Medicine Bow	Laramie Peak	Antelope Creek	26 N	73 W	17	50	45	1974	10 years +
19	Medicine Bow	Laramie Peak	Antelope Creek	26 N	73 W	24	-	-	1976	--
20	Medicine Bow	Laramie Peak	Friend Creek	26 N	72 W	8	2	1	1974	12 years
21	Medicine Bow	Laramie Peak	Bear Creek	26 N	72 W	19	16	13	1974	15 years
22	Medicine Bow	Laramie Peak	Willow Creek	25 N	73 W	11	1	1	1974	--
23	Medicine Bow	Laramie Peak	Cow Creek	25 N	73 W	30	-	-	1976	--
24	Medicine Bow	Laramie Peak	Antelope Creek	25 N	73 W	33	-	-	1976	--
25	Medicine Bow	Laramie Peak	Antelope Creek	25 N	73 W	34	-	-	1976	--
3/ 26	Medicine Bow	Laramie Peak	Potato Creek	25 N	72 W	30	4	4	1974	15 years
27	Medicine Bow	Laramie Peak	Potato Creek	25 N	72 W	20	-	-	1974	--

TABLE 1 KNOWN LOCATIONS OF WHITE PINE BLISTER RUST ON LIMBER PINE EAST OF THE CONTINENTAL DIVIDE IN WYOMING

(continued)

SAMPLE AREA	LAND UNIT		DRAINAGE	LOCATION			WHITE PINE		YEAR DISCOVERED	AGE PF OLDEST INFECTION
	FOREST	DISTRICT		T	R	S	NUMBER EXAMINED	NUMBER INFECTED		
<u>4/</u> 28	Medicine Bow	Laramie Peak	George Creek	24 N	73 W	2	-	-	1976	--
<u>4/</u> 29	Medicine Bow	Laramie Peak	George Creek	24 N	73 W	11	-	-	1976	--
<u>4/</u> 30	Medicine Bow	Laramie Peak	North Creek	24 N	73 W	14	-	-	1976	--
<u>4/</u> 31	Medicine Bow	Laramie Peak	North Creek	24 N	73 W	23	-	-	1976	--
32	Medicine Bow	Laramie Peak	Sturgeon Creek	25 N	72 W	24	1	1	1973	10 years
33	Medicine Bow	Laramie Peak	Sturgeon Creek	25 N	72 W	25	-	-	1974	--
34	Medicine Bow	Laramie Peak	Sturgeon Creek	25 N	72 W	36	1	1	1973	10 years
35	Medicine Bow	Laramie Peak	Siebolt Creek	24 N	72 W	10	-	-	1969 & 1974	10 years
36	Medicine Bow	Laramie Peak	Wallace Draw	24 N	72 W	17	-	-	1969	--
37	Medicine Bow	Laramie Peak	McFarlane Creek	24 N	71 W	6	6	6	1973	--
38	Medicine Bow	Laramie Peak	Luman Creek	24 N	71 W	10	-	-	1969	--
39	Medicine Bow	Laramie Peak	Laramie Creek	23 N	72 W	13 & 24	-	-	1974	--
40	Medicine Bow	Laramie Peak	Laramie Creek	23 N	72 W	20 & 21	8	2	1974	25 years
41	Medicine Bow	Laramie Peak	Laramie Creek	23 N	72 W	23 & 24	-	-	1974	--
42	Shoshone	Clarks Fork	Littlerock Creek	57 N	103 W	22	108	7	1966	25 years

1/ Never reconfirmed; three subsequent visits.

2/ Some trees had both white pine blister rust and limber pine dwarf mistletoe on them.

3/ These trees were heavily infected with 50 or more branch cankers per tree.

4/ Heavy amounts of rust were seen in these areas which has resulted in some branch dieback or killing.

TABLE 2 KNOWN LOCATIONS OF WHITE PINE BLISTER RUST ON LIMBER PINE WEST OF THE CONTINENTAL DIVIDE IN WYOMING

SAMPLE AREA	LAND UNIT		DRAINAGE	LOCATION			WHITE PINE NUMBER EXAMINED	NUMBER INFECTED	YEAR DISCOVERED	AGE OF OLDEST INFECTION
	FOREST	DISTRICT		T	R	S				
43	Teton	--	Dime Creek	47 N	115 W	5	30	3	1967	10 years
44	Grand Teton National Park	--	Snake	44 N	115 W	27	50	1	1956	--
45	Targhee	--	Darby Creek	43 N	118 W	14	50	1	1955	--
46	Teton	--	Trail Creek	41 N	118 W	24	50	1	1959	13 years
47	Teton	--	Hoback River	38 N	114 W	6	20	1	1967	26 years
48	Targhee	--	Wolf Creek	37 N	117 W	4	-	-	1965	--
49	Bridger	--	Strawberry Creek	34 N	118 W	26	6	6	1967	--
50	Bridger	--	Pine Creek	35 N	108 W	8	-	-	1967	--